

## HINGE ASSEMBLY

### 1 BACKGROUND OF THE INVENTION

#### 2 1. Field of the Invention

3 The present invention relates to a hinge assembly, and more particularly  
4 to a hinge assembly having a fixing ring with a notch defined in a side face  
5 thereof and a position ring with a protrusion formed on a side face thereof to  
6 correspond to the notch of the fixing ring such that when the protrusion is  
7 received in the notch, the position seat is fixed relative to the fixing seat and  
8 when the protrusion is away from the notch, movement of the position seat  
9 forces resilient pads to provide necessary friction for supporting the computer  
10 screen.

#### 11 2. Description of Related Art

12 Hinge devices are commonly used everywhere in our lives to provide  
13 relative pivotal movement between objects. A common example is the hinge  
14 device used in a laptop computer. Normally, the hinge device has a fixing seat  
15 which is adapted to connect to the mainframe of the laptop computer and a  
16 position seat adapted to connect to the screen of the laptop computer. A friction  
17 element is provided between the fixing seat and the position seat so that when  
18 there is relative movement between the fixing seat and the position seat, the  
19 friction element is able to provide necessary friction to support the screen at a  
20 certain position. However, after being used for a period, the hinge device  
21 between the screen and the mainframe becomes worn. That is, the friction  
22 element can not provide the necessary friction any more due to the friction wear

1 with both the fixing seat and the position seat. Once the friction is not enough,  
2 the screen can no longer be supported at a desired angle and thus the laptop  
3 computer user will have to adapt himself/herself to the screen position. The  
4 worst situation is that the user will have to rely on auxiliary devices to maintain  
5 the screen at a desired position, which is quite annoying and troublesome.

6 To overcome the shortcomings, the present invention tends to provide an  
7 improved hinge assembly to mitigate the aforementioned problems.

8 SUMMARY OF THE INVENTION

9 The primary objective of the present invention is to provide an improved  
10 hinge assembly having a fixing seat, a position seat pivotal relative to the fixing  
11 seat, a fixing ring secured to the position seat and provided with a notch in a side  
12 face thereof and a position ring pivotal relative to the fixing ring and provided  
13 with a protrusion alternatively received in the notch. Therefore, when the  
14 protrusion is received in the corresponding notch, the screen is positioned and  
15 when the protrusion is away from the corresponding notch, axial movement of  
16 the position ring is able to compress resilient pads to provide the necessary  
17 friction to support the screen at a specific position relative to the mainframe.

18 Another objective of the present invention is that the fixing ring has a  
19 pair of extensions formed on the other side face thereof to correspond to a pair of  
20 cutouts circumferentially defined in the position seat such that when the  
21 extensions are received in the corresponding cutouts, the fixing ring is secured to  
22 the position ring and is able to pivot along with the position seat. However, the  
23 position seat is immovable relative to the fixing seat to allow the protrusion of

1 the position seat to be movably received in the corresponding notch.

2 Other objects, advantages and novel features of the invention will  
3 become more apparent from the following detailed description when taken in  
4 conjunction with the accompanying drawings.

5 BRIEF DESCRIPTION OF THE DRAWINGS

6 Fig. 1 is a perspective view of the hinge assembly of the present  
7 invention;

8 Fig. 2 is an exploded perspective view of the hinge assembly of the  
9 present invention;

10 Fig. 3 is schematic top plan view showing that the position seat is in a  
11 first horizontal position relative to the fixing seat;

12 Fig. 4 is a schematic top plan view showing that the position seat is  
13 extending upright relative to the fixing seat; and

14 Fig. 5 is a schematic top plan view showing that the position seat is in a  
15 second horizontal position relative to the fixing seat.

16 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

17 With reference to Fig. 1, the hinge assembly in accordance with the  
18 present invention includes a fixing seat (1), a fixing ring (2), a position ring (3),  
19 multiple resilient pads (4) and a position seat (5).

20 With reference to Fig. 2, the fixing seat (1) is composed of a plan body  
21 (11), a fixing leg (12) extending downward from the plan body (11) to be adapted  
22 to connect to a computer mainframe (not shown) and a connection plate (13)  
23 extending upright from the plan body (11) and defining therein a through hole

1 (131).

2        The fixing ring (2) includes a pair of extensions (21) formed on a side  
3    face of the fixing ring (2), two recessed areas (22) defined to separate the two  
4    extensions (21) and a pair of notches (23) oppositely defined in a side face of the  
5    fixing ring (2) relative to the side face having the pair of extensions (21).

6        The position seat (3) has a pair of protrusions (31) oppositely extending  
7    from a side face of the position seat (3) to correspond to the pair of notches (23).

8        The resilient pads (4) are conical shapes and oppositely engaged with  
9    one another.

10       The position seat (5) has a first position bar (51) and a second position  
11    bar (52) securely connected to the first position bar (51). The first position bar  
12   (51) has an annular body (511) formed on a free end of the first position bar (51)  
13   and defining therein a first position hole (512) and a pair of cutouts (513)  
14   oppositely formed on a circumference of the annular body (511). The second  
15   position bar (52) has a second annular body (521) formed on a free end of the  
16   second position bar (52) and defining therein a second position hole (522). A  
17   second connection plate (53) extends out from the position seat (5) and defines  
18   therein a second through hole (531) for connection to the laptop screen.

19       A pad assembly (6) is provided between the fixing seat (1) and the  
20   position seat (5) to avoid direct engagement between the fixing seat (1) and the  
21   position seat (5).

22       A connection rod (7) is provided to extend through the through hole (131)  
23   of the fixing seat (1), the pad assembly (6), the first position hole (512), the

1 fixing ring (2), the position ring (3), the resilient pads (4) and the second position  
2 hole (522) to connect to a securing device (8) so as to securely sandwich the  
3 fixing ring (2), the position ring (3) and the resilient pads (4) between the first  
4 annular body (511) and the second annular body (521). The securing device (8)  
5 may be a common combination of nut and pads so that engagement between the  
6 connection rod (7) and the securing device (8) may be accomplished by screwing  
7 the distal end of the connection rod (7) with the nut of the securing device (8).

8 When the hinge assembly of the present invention is in assembly, the  
9 fixing seat (1) and the position seat (5) are respectively adapted to connect to the  
10 laptop mainframe (not shown) and the laptop screen. Then, the connection rod (7)  
11 is applied to extend through the through hole (131) of the fixing seat (1), the pad  
12 assembly (6), the first position hole (512), the fixing ring (2), the position ring  
13 (3), the resilient pads (4) and the second position hole (522) to connect to the  
14 securing device (8) so as to securely sandwich the fixing ring (2), the position  
15 ring (3) and the resilient pads (4) between the first annular body (511) and the  
16 second annular body (521). Thereafter, it is noted that the pair of extensions (21)  
17 is received in the corresponding cutouts (513) of the first annular body (511) so  
18 that the engagement between the fixing ring (2) and the position seat (5) is  
19 secured. Meanwhile, the protrusions (31) of the position ring (3) is received in  
20 the corresponding notch (23) of the fixing ring (2), which is shown in Fig. 3.  
21 Furthermore, while the protrusions (31) are received in the notches (23), the  
22 screen, which is connected to the position seat (5), is positioned securely.

23 With reference to Figs. 3, 4 and 5, it is noted that when the position seat

1 (5) is at its first horizontal position relative to the fixing seat (1), because the  
2 extensions (21) are received in the corresponding cutouts (513) of the position  
3 seat (5) and the first annular body (511) is received in the recessed areas (22) of  
4 the fixing ring (2), the fixing ring (2) is secured relative to the fixing seat (1).

5 Meanwhile, the protrusions (31) are respectively received in the notches (23) of  
6 the position ring (3). Therefore, the position seat (3), which is adapted to connect  
7 to the laptop computer screen, is securely positioned.

8 When the position seat (5) is pivoted to an upright position relative to the  
9 fixing seat (1), the engagement between the fixing ring (2) and the fixing seat (1)  
10 is unchanged. However, due to the pivotal movement of the position seat (5), the  
11 protrusions (31) are away from the corresponding notches (23), by which the  
12 position ring (3) is forced to have an axial movement away from the fixing ring  
13 (2). The axial movement of the position ring (3) thus compresses the resilient  
14 pads (4). Because the position ring (3) securely engages with the fixing ring (2),  
15 the compressed resilient pads (4) are able to provide the necessary friction to  
16 support the position seat (5) at a certain position.

17 When the position seat (5) is again pivoted in the same direction as that  
18 discussed above, the protrusions (31) are moved into the corresponding notch  
19 (23) of the fixing ring (2), which again secures the engagement between the  
20 fixing ring (2) and the position ring (3) and a positioning effect to the position  
21 seat (5) is provided. Thus the screen, which is adapted to connect to the position  
22 seat (5), is supported.

23 It is to be understood, however, that even though numerous

1 characteristics and advantages of the present invention have been set forth in the  
2 foregoing description, together with details of the structure and function of the  
3 invention, the disclosure is illustrative only, and changes may be made in detail,  
4 especially in matters of shape, size, and arrangement of parts within the  
5 principles of the invention to the full extent indicated by the broad general  
6 meaning of the terms in which the appended claims are expressed.